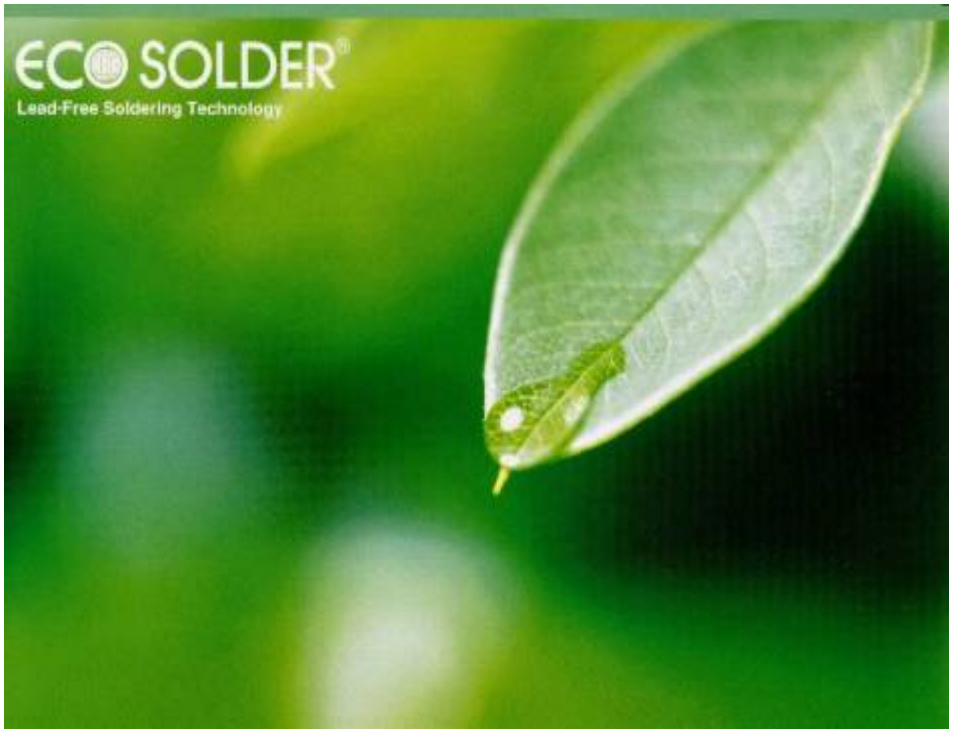
Senju Metal Industry Co.,LTD.

ECO SOLDER®

Pb-Free Solder Paste

M705-LFAC19



Manufacturer

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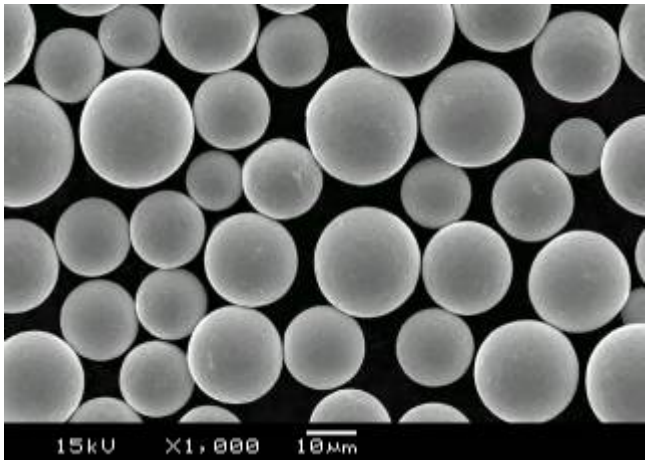
ECO SOLDER PASTE M 7 0 5 - L F A C 1 9

M705-LFAC19 is a lead free pastes developed for the jet system.
This pastes to be able to adjust the viscosity property to adjust to a special usage and to do a stable supply. This pastes uses of Type 5 powder ,but good wetting for hot air reflow oven. Moreover, it is possible to get wet enough even if shifting from the pcb pad. And, the soldering ball is not generated either.

A characteristic of M705 alloy

		M705	63Sn-Pb
Alloy Composition(%)		Ag3.0-Cu0.5-SnBal	Sn63-PbBal
Specific gravity		7.4	8.4
Melting temperature (C)	Solidus	217	183
	Peak	219	
	Liquidus	220	
Tensile strength (Mpa)		53.3	56.0
Elongation(%)		46	59
Young's module (GPa)		41.6	26.3
0.2% Yield point (MPa)		39.4	45.8
CTE (ppm/C)		21.7	23.5
Vickers Hardness (Hv)		17.9	16.6

SEM Photo of Solder powder



This powder is a globular form, and has very little surface oxidization. Such is the case with all ECO-solder paste products from Senju Metals. This picture shows type- 5 (15-25um) as a reference

M705-LFAC19 characteristics

Items	M705-LFAC19	Test method /Remarks
Solder Powder		
Alloy Composition	Ag3.0-Cu0.5-Sn:Balance	---
Melting Temperature	Solidus: 217 °C Peak: 219 °C Liquidus: 220 °C	DSC
Powder Shape	Spherical	SEM
Powder size/distribution	15 ~ 25um (Standard)	SEM & Laser method
FLUX		
Type	RO	J-STD-004
Activity	L0	J-STD-004 Titration method of Flux
Halogen	0.01%under/Flux	Titration method
Surface Insulation Resistance (40C90%RH,168hr)	Over 1.0E+12	JIS Z 3284
Electro-migration Resistance (85C85%RH Bias DC45V, 1000hr)	Over 1.0E+9 No visible migration	JIS Z 3284
Copper mirror test	PASS	JIS Z 3197
Fluoride Test	PASS	JIS Z 3197
Solder Paste		
Viscosity	100Pa.s	JIS Z 3284
Thixotropic Index	0.7	JIS Z 3284
Flux Content	14.0%	JIS Z 3197
Slump in Heat	0. 7 mm Max.	JIS Z 3284
Tackiness	1.0N/2.0 N	JIS Z 3284/IPC TM-650 2.4.44
Tackiness time	Over 1.0N/2.0N 24hr	JIS Z 3284/IPC TM-650 2.4.44
Copper plate corrosion test	PASS	JIS Z 3197
Validity (unopened, keep in cool:0 ~ 10C)	**6 months**	---

** number of this table is for reference

About M705-LFAC19

Name of product

ECO SOLDER®

M705-LFAC19

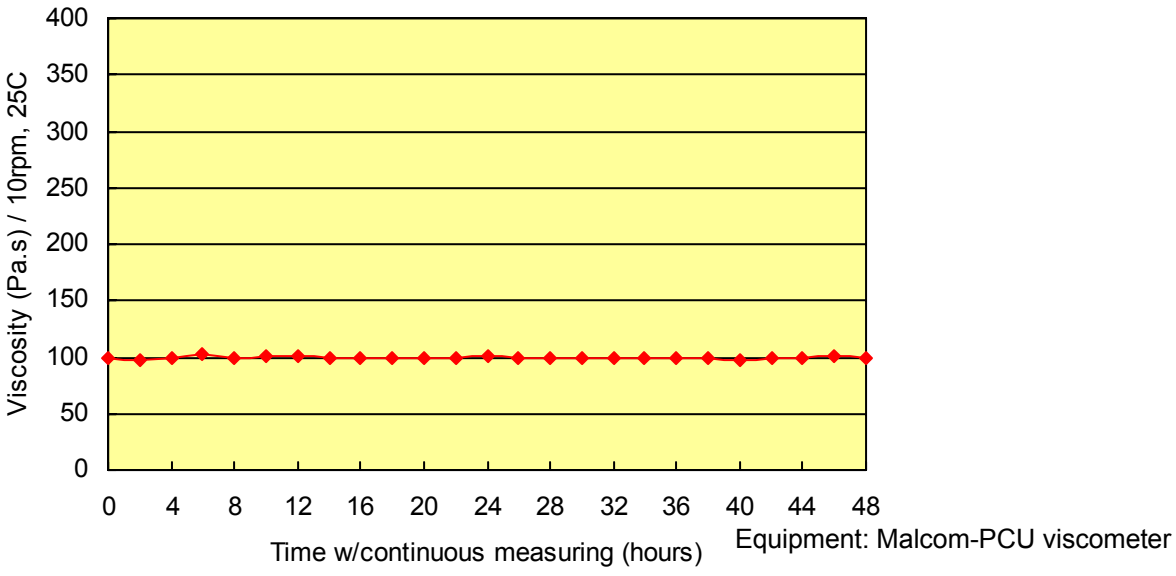
- Product considered Environment
- Type of Solder Alloy
- Type of Flux

Lot No.

Lot No. B0101-E31

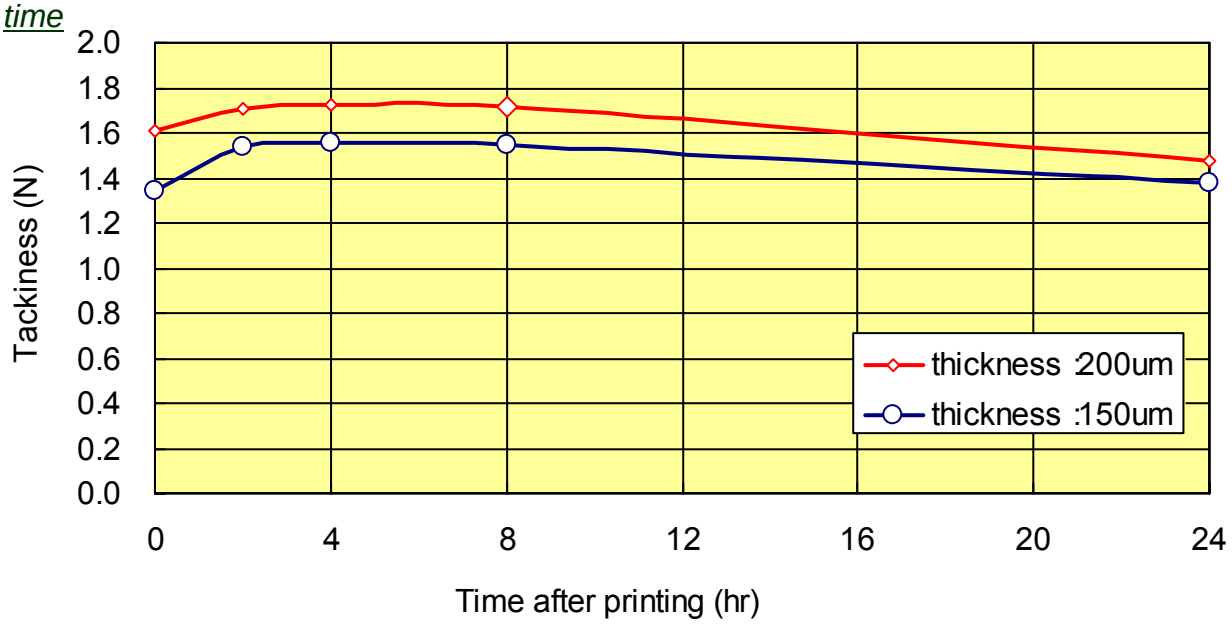
- Product Year(A : 2004 B:2005 C:2006)
- Product Day (01,Jan)
- Daily Product Lot Number

M705-LFAC19 stability of viscosity



This product has little change from the first stage, and its printing characteristics are stable over a long period of time.

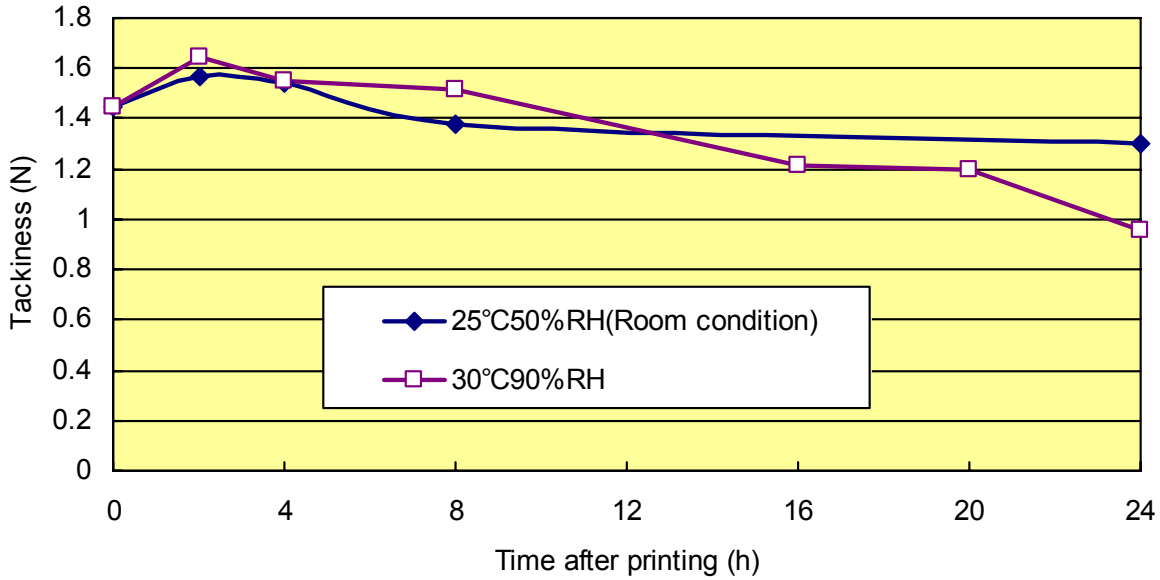
M705-LFAC19 Tackiness and Tackiness time



Tackiness and Tackiness time
M705-LFAC19
Test conditions:
Equipment : Rhesca, Tackiness tester
Immersion speed : 2.0mm/s Press time : 0.2s
Press load : 0.49N Test speed : 10.0mm/s
Environment : 25℃50%RH

Paste tackiness and tack time are important characteristics influencing the component loading in high-speed placement (PCB) type of equipment.
Tackiness time especially affects the defect rate (missing component, tombstone etc.) after pausing for machine maintenance.
LFAC19 has higher initial tackiness and longer tackiness over time after printing.

M705-LFAC19 Tackiness and Tackiness time under the humidity environment

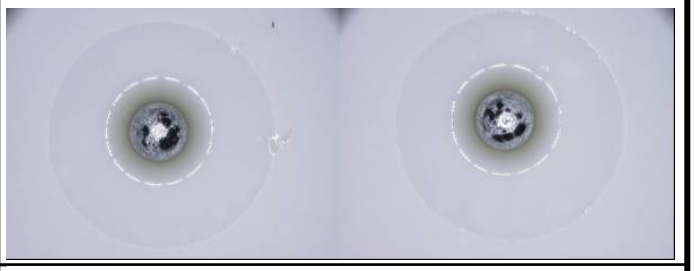


M705-LFAC19 Solder Ball

Solder ball test M705-LFAC19

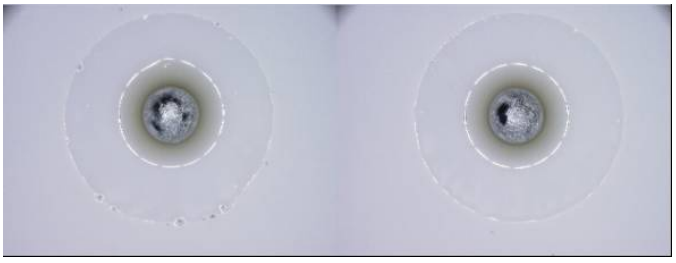
(JIS Z 3284)
Stencil thickness : 150um
Preheat : 180℃120sec
Peak temp. : 235℃ (above 220℃ 40sec)

Initial



After 8hrs

After 2hrs



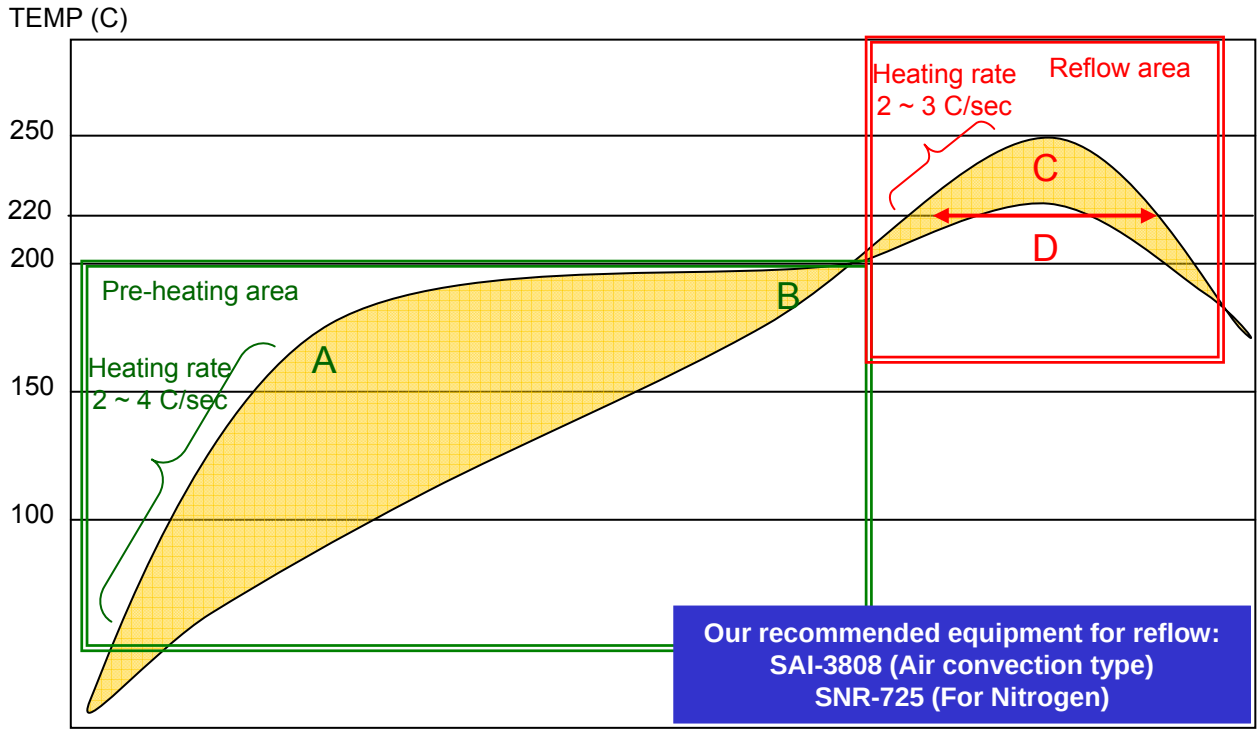
After 24hrs

After 4hrs

M 7 0 5 - L F A C 1 9 Recommended reflow temperature profile

Senju's recommended reflow temperature profile for M 7 0 5 - L F A C 1 9 is shown below.
On the PCB, a difference of temperature occurs according to differences in heat capacity of parts on the assembled PCB.
However, it is ideal that all soldering points on the PCB reach the following recommended zones and times.

In addition, soldering characteristics may vary depending on reflow oven specifics, PCB mounting, and loading components. Performing a check evaluation is recommended.



Recommendation Value at each point			
A: soak start:	150 ~ 180℃	C: Peak temp.:	230 ~ 250℃
B: soak end:	170 ~ 200℃	D: time above 220℃ (solidus line)	30 ~ 60sec
A - B: soak time:	90±30sec		

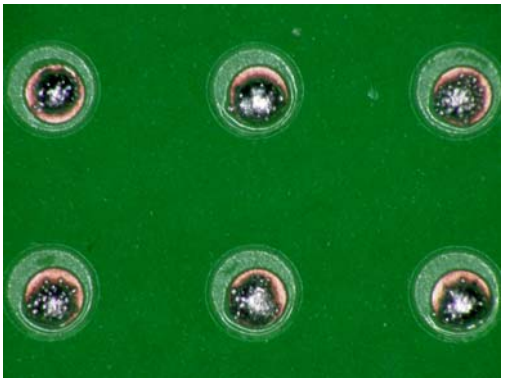
The use of nitrogen improves soldering.

M705-LFAC19 Reflow-ability

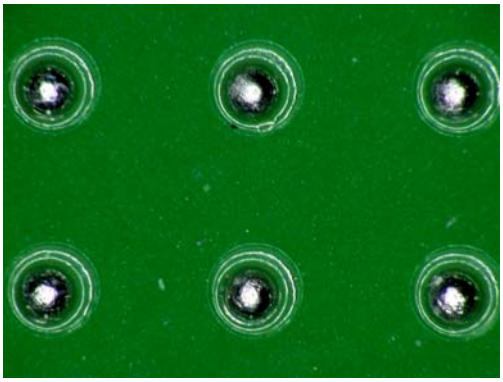
Melting behaviour

aperture : 280um
thickness : 120umt
preheat : 180 ~ 200℃/120sec
peak : 240℃(above 220℃ 45sec)

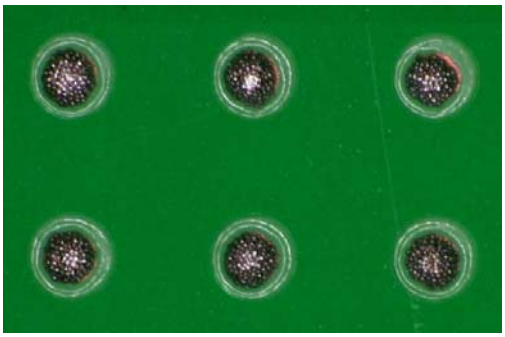
Standard M705 paste (25 ~ 36um)



M705-LFAC19



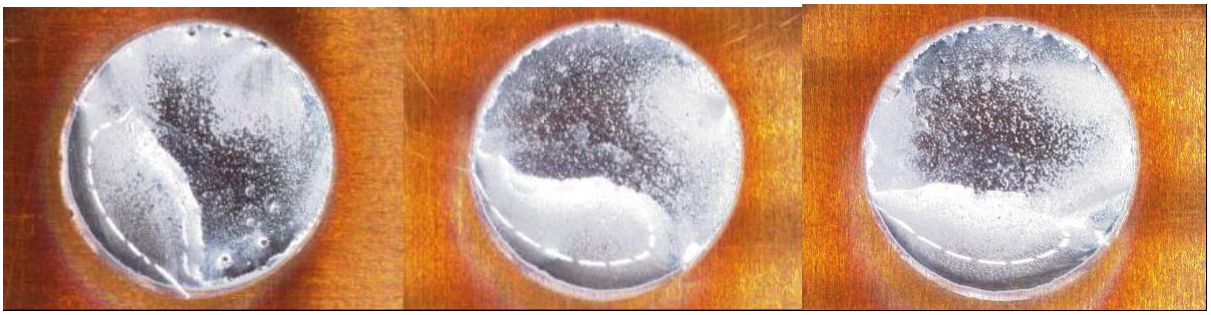
Standard M705 paste (15 ~ 25um)



M705-LFAC19 Wet-ability

Wetting and Dewetting
M705-LFAC19

(JIS Z 3284)
Stencil thickness : 150um
Preheat : 180℃120sec
Peak temp. : 235℃ (above 220℃ 40sec)



M７０５－ＬＦＡＣ１９ Reliability

Copper Corrosion Test
M７０５－ＬＦＡＣ１９
(JIS Z 3197)

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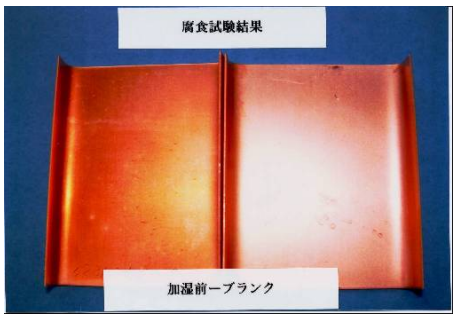
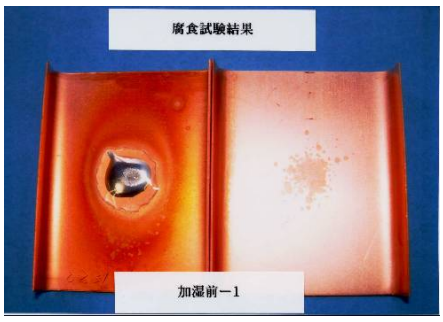
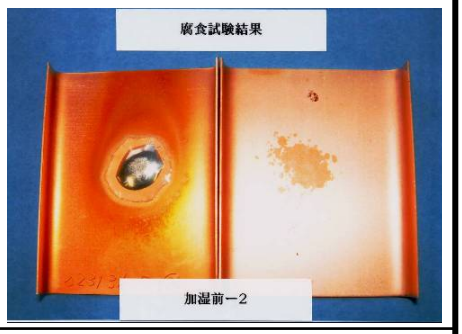
<tr><td> 
</td><td colspan="2"> 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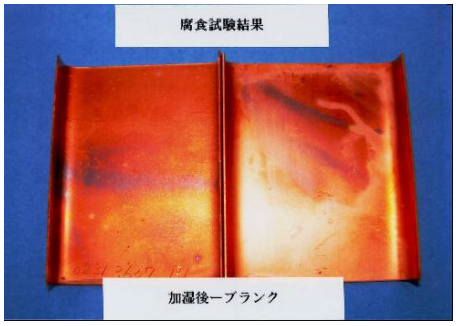
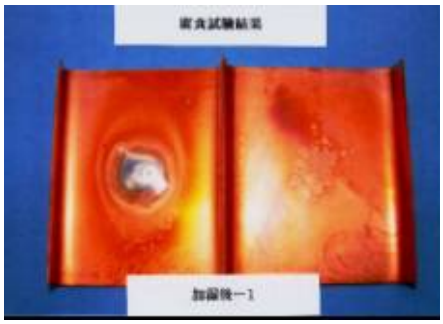
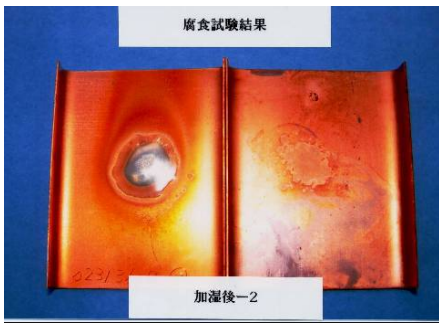
<tr><td>Initial　（blank）</td><td colspan="2">Initial　（Ｍ７０５－ＬＦＡＣ１９）</td></tr>
<tr><td> 
</td><td colspan="2"> 

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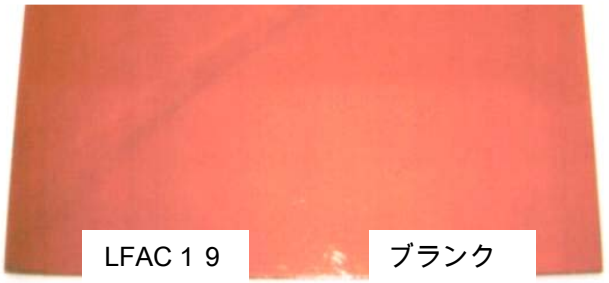
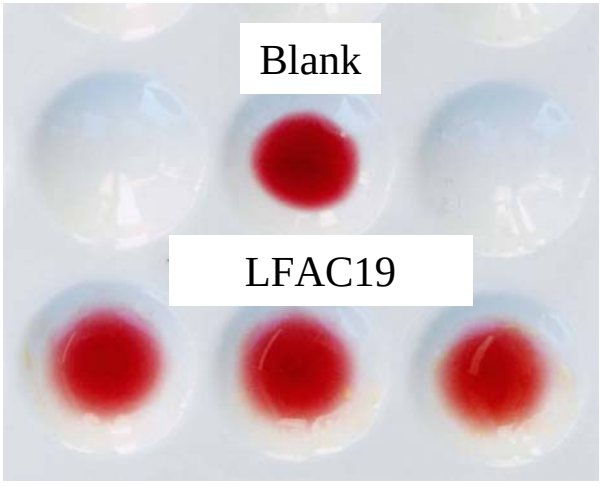
<tr><td>After 72hrs at 40℃90%　（blank）</td><td colspan="2">After 72hrs at 40℃90%　（Ｍ７０５－ＬＦＡＣ１９）</td></tr>
</table>

Copper Mirror Test
M７０５－ＬＦＡＣ１９
(JIS Z 3197)



Fluoride Test
M７０５－ＬＦＡＣ１９
(JIS Z 3197)

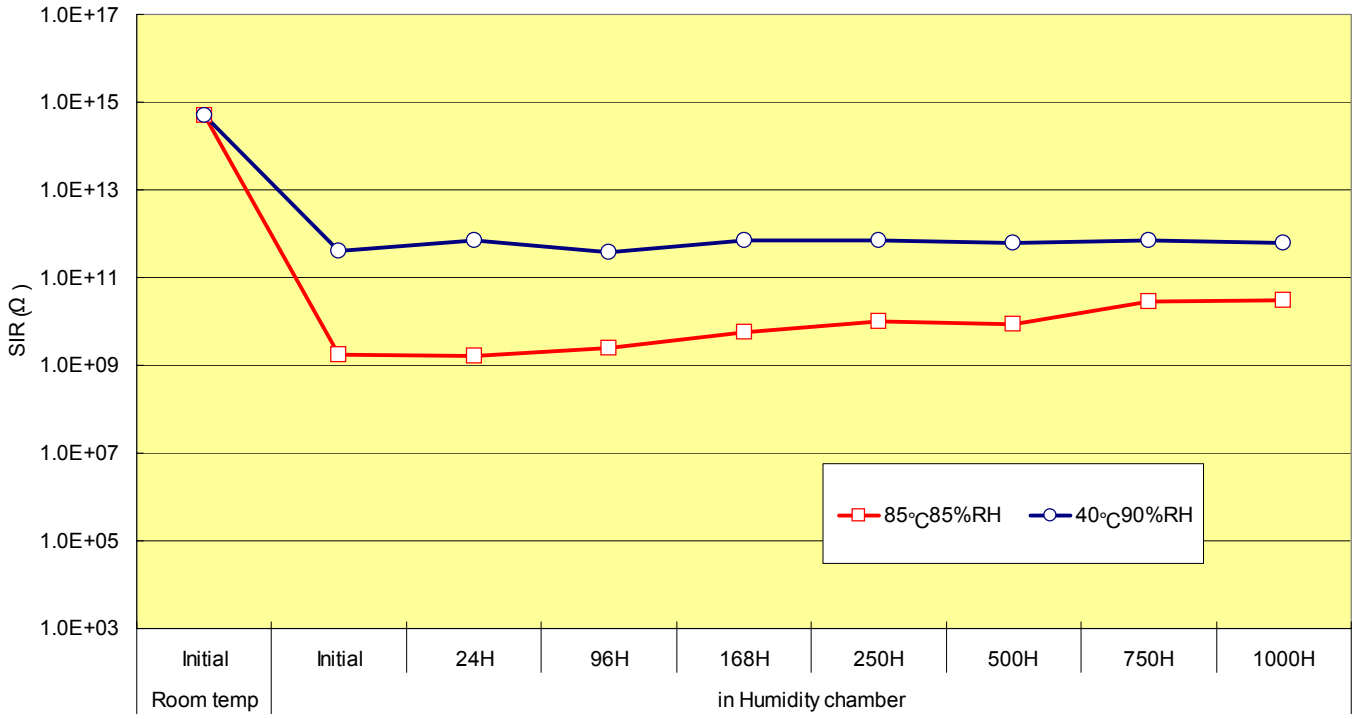


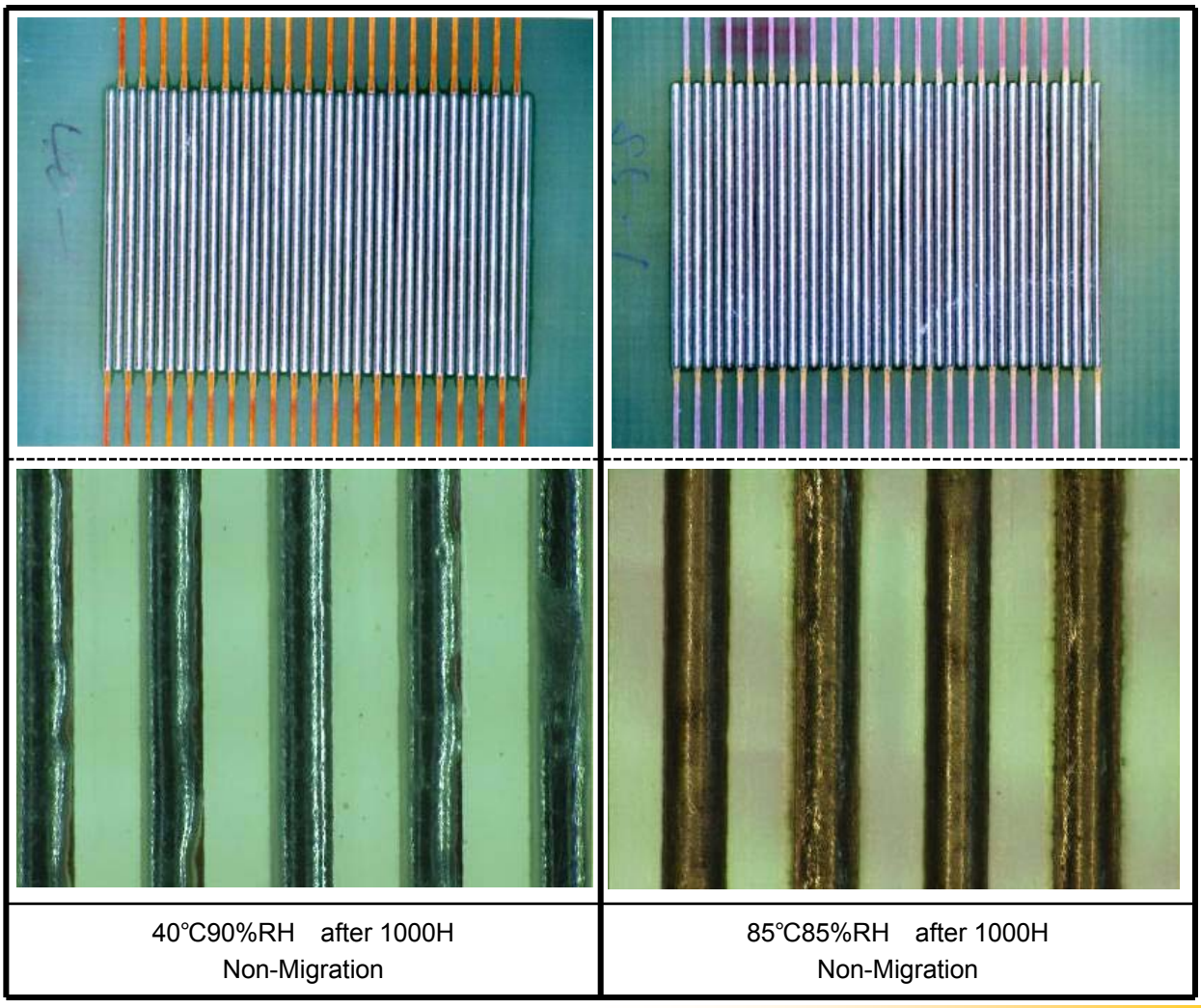
M705-LFAC19 Reliability

Migration test

Test condition:
40°C90%RH , 85°C85%RH

Measuring Voltage: 100V (In chamber)
Applied Voltage: 45V

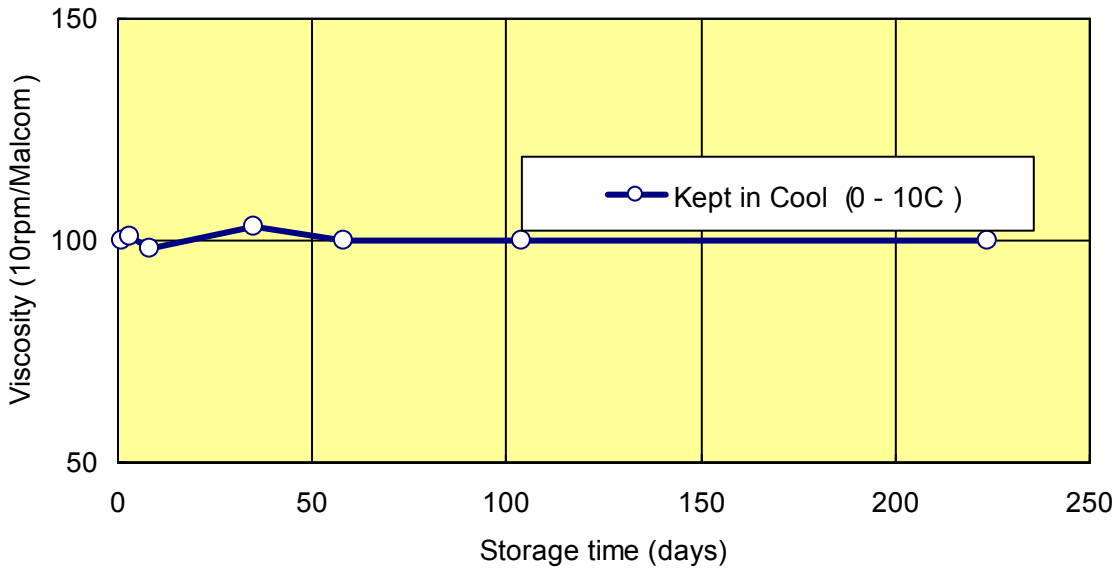




40°C90%RH after 1000H Non-Migration	85°C85%RH after 1000H Non-Migration

M705-LFAC19 Storage stability

Viscosity monitoring results with Storage time (Initial ~ over 6 months)



Quality and stability over long periods of time are characteristics required to make paste material workable. Especially in the case of irregularities in production and other operation variables.
In addition, the guaranteed shelf life for this paste is six months in syringe and refrigerated storage condition (0-10 degrees C).